Records of evaporation from a free water surface should be obtained for the entire period covered by the investigation. Work could also be done in determining transpiration and soil evaporation by tank experiments and from daily fluctuations of the water table shown by water-stage recorders over wells. Indeed, with the methods that have been outlined, the accuracy of the results in a quantitative study of the water resources of an area will be largely a function of the funds and time available for making the investigation. 551.55

W. Peppler on characteristic features of air currents on coasts (*Meteorologische Zeitschrift, February, 1929*).—The remarks of W. Georgii and H. Koschmeider in *Heft* 8, *Meteorologische Zeitschrift*, 1928, lead me to make a few statements relative to the air currents on the coast of Flanders. In the course of the two years during which I was engaged in the work of the naval kite station at Breedene near Ostend, I had abundant opportunity to become acquainted with the interesting conditions of the current as it came from the open sea upon the land and also with the effect of the dunes upon the current. Although there was no opportunity to undertake special investigations of definite individual problems, the characteristic features of the coast as related to aerology forced themselves into notice at the times of the daily kite flights.

Especially with stormy west winds there was plainly observed the influences of the coast and the dunes in producing an intensification of disturbances in the air. For this reason and on account of the well known stormy character of the weather on the coast of the channel, the kite station suffered considerably until a certain adaptation of kite technique was taken up, and with a specially strong kite, constructed according to instructions from Herman John, there came success, even in a heavy storm, in launching and landing it for the most part undamaged. One can hardly imagine the terific wind velocities and the extraordinary turbulence that often prevail in the wind currents of the channel.

In a storm the following conditions were characteristic: If the west storm was from the open sea against the coast the wind velocities on the shore in front of the dunes were considerably greater than those at the kite station situated on a level plot of ground 300 meters behind the dunes. Despite the relatively slight elevation of the dunes (about 30 meters) their windbreak effect stretched inland at least 400 meters. Of course, it is to be taken into consideration that even on a flat shore the wind force decreases rapidly toward the interior on account of the sudden and marked increase in friction with the passage of the current from sea to land. There forms, so to speak, a pillow of air over which the succeeding masses of air must mount. Behind the dunes in the space where the conditions were affected by the windbreak there was an extraordinary increase in wind velocity, usually from 10 to 30 meters per second, from the ground to about 60 meters elevation, where in some cases 35 meters per second must have prevailed in so far as could be determined with any certainty from the course of the small storm kites. Generally it was observed that the kite entered more or less suddenly into an extremely turbulent current when it came to the elevation of the crests of the dunes. This stratum of turbulence had a thickness of about 100 meters. Above it the flow of air became somewhat more steady and in many cases the mean velocity decreased to increase again above some 500 meters. In the stratum of turbulence above the elevation of the crests of the dunes there pass in rapid succession over the relatively calm, lower stratum very strong whirls that bring marked oscillations in the readings of the dynamograph. These whirls evidently originate through friction and the damming of the current on the dunes.

In the current behind the dunes the following strata can be differentiated:

1. Relatively calm, less turbulent ground stratum that reaches to the height of the crests of the dunes. Here there is very marked increase in wind force upward from the ground.
2. Stratum of greatest turbulence between about 40 and 100 meters elevation. The lower and upper limits of this stratum are more or less plainly marked.
3. Stratum of moderate turbulence with wind velocity frequently decreasing upward.

In flights during stormy west winds the vertical temperature was such that up to from 50 to 100 meters above the ground (upper limit of the second stratum) there prevailed marked decrease in temperature (frequently 1° C. per 100 meters). In another paper [1] I have shown that for the average of many flights the vertical temperature gradient of the ground stratum increases in proportion to the wind velocity. As is well known, the cause is mechanical intermixing. Striking and unexpected to me, however, was the frequent observation that the temperature gradient decreased above the ground stratum and that there lay at from 50 to 100 meters elevation a slight inversion or then isothermacy. At first I thought this discontinuity the remnant of a nocturnal ground inversion; however, this view was not tenable since with cloudy weather and storm from the west inversions could neither form nor maintain themselves. Moreover, these discontinuities occurred with the afternoon flights also.

The fact that these discontinuities are not always present with westerly winds is explainable when they occur in the same manner as the mountain inversions cited by W. Georgii, occurring, thus, only when the lapse rate in the undisturbed current is less than 1° C. per 100 meters. In the storm the lapse rate in the ground stratum is often equal to or greater than 1° C. per 100 meters. The fact that this discontinuity, originating in the obstruction presented by the dunes, lies not directly at the crests of the dunes, but at a higher elevation is explained by the stratum of turbulence. One can conceive of the boundary between this and the upper undisturbed current as a kind of glide surface, although it is of a kind other than the glide surface between different bodies of air. In conclusion, I may mention that the upward wind over the dunes occasionally makes itself evident in fracto-nimbus cloudlets that form in strong wind over the dunes (and only there) at elevations of from 100 to 200 meters.

It is regrettable that the individual flights and the numerous interesting meteorological, aerological, and cloud observations contained in my war journal of over 5,000 pages could not be published on account of lack of funds. They contain, among other things, many interesting notes and observations on the air current and temperature conditions on coasts.—*Translated by W. W. Reed.*

Nile silt does not enrich the soil.—It has been held since the ages of the Pharaohs that silt enriches the soil and the classical example given is the Nile Valley. Comes along now Dr. E. McKenzie Taylor, of the School of Agriculture, University of Cambridge, England, who holds that the age-worn view is fallacious.[2] The editor of that journal in commenting upon the article rightly

[1] Aerologische und hydrographische Beobachtungen der deutschen Marine-Stationen während der Kriegzeit 1914 bis 1918. Die Beobachtungen der Marine-Drachenstationen Breedene Meer und St. Michel bei Brügge in den Jahren 19 15bis 1918. Heft 3 und 4. Deutsche Seewarte, Hamburg, 1922.

[2] E. McKenzie Taylor, Engineering News-Record, June 20, 1929.

points out that the deltaic plain of Egypt resembles the Imperial Valley of California, both being the creation of silt-laden streams and that millions of dollars have been expended in that valley to get rid of the silt.

Since Doctor Taylor is one of the first high authorities to question the value of Nile silt and since should further experiments corroborate his findings the effect would not only be far reaching but also it would justify the course followed by American engineers in the Imperial Valley of California.

Dr. Taylor's conclusions are:

1. A dressing of Nile silt without a summer fallow does not maintain crop yields.
2. A dressing of Nile silt following a summer fallow (as in the basin system of irrigation) does not increase crop yield.
3. The summer fallow is the effective agent in the maintenance of soil fertility under perennial irrigation.
4. Nile silt is not the agent responsible for the maintenance of soil fertility and has not the fertilizing properties previously attributed to it without investigation.—*A. J. H.*

A rare day in August.—The weather of August 4 in Washington, D. C., was exceptionally pleasant, coming as it did after 10 consecutive days with maximum temperature above 90° F. Nearly an inch of rain fell the night of the 3d–4th and the wind shifted to northwest, whence it blew all day of the 4th with a speed about 100 per cent above the average August speed. This combination, clear sky and fresh northwest winds, is rarely experienced in the summer months in Washington, D. C.

The barometric formations that led to this very agreeable change are of more than passing interest since they raise the age-old query, Why do cyclones at times increase in intensity? By intensity is meant an increase in the barometric gradient that materially strengthens the winds.

The barometric situation on the morning of August 2 was as follows: A trough of low pressure, axis, n/s stretched from eastern Nebraska to and beyond the Canadian border; in the southern end of the trough was a secondary cyclone with a closed isobar of 29.70 inches. Directly to the eastward an anticyclone with inner isobar of 30.10 inches covered Michigan and part of Lake Huron. The juxtaposition of these two formations doubtless gave to the secondary cyclone what may be called potential energy of position, since the winds on its eastern front were augmented and intensified by the circulation of the anticyclone, the wind direction in both circulations being substantially the same direction and thus they contributed to the convergence of air streams in the east front of the cyclone. The increase in intensity may be measured by the 12-hour pressure fall associated with the cyclone; on the morning of the 2d it was 0.16 inch, by the p. m. of the same day it had increased to 0.18 inch and by the a. m. of the 3d it was 0.28 inch and 2-hour pressure falls of 0.04 to 0.6 inch were reported from nine stations, thus showing a spreading of the pressure fall in the cyclone. On the morning of the 4th the central pressure fall had increased to 0.48 inch and one station reported a 2-hour fall of 0.12 inch; by this time the central isobar of the cyclone had dropped from 29.70 inches to 29.30 inches and the cool winds on its west side were fresh from the northwest bringing an agreeable respite from the high temperatures of the previous week or 10 days.—*A. J. H.*

Meteorological summary for Chile, July, 1929 (by J. Bustos Navarrete, Observatorio del Salto, Santiago, Chile).—This month was relatively dry in the central zone, and somewhat rainy in the southern part of Chile.

During the first days of the month there prevailed, generally, a régime of high pressure with variable weather in the south. Between the 7th and the 9th a relatively important depression crossed the extreme southern region and brought unsettled weather and rain between Concepcion and Chiloe. In the southern zone the unsettled conditions persisted until the 12th.

After an interval of calm another depression appearing from the west on the 15th caused general rains from Atacama to Chiloe on the 16th; on the following day the unsettled weather gave place and there was established an anticyclonic régime that continued, with variations, until the close of the month. In this period only one relatively important depression crossed the extreme south; this was accompanied by rain on the 27th extending north to Concepcion.

Monthly precipitation in inches was recorded as follows: At Santiago, 1.10; in the region of Concepcion, 2.87; and in the region of Valdivia, 21.02.—*Translated by W. W. R.*

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